It is probable, however, that the higher record in these places was due to some extent to city influence and not entirely to lake influence, and hence the peach crop has been damaged to some extent even close to the lake shore and on the islands near Sandusky.

A comparison of the difference in the record at the Columbus station and that at the Ohio State University (see the last stations in the table) shows the effect of the city combined with difference in elevation in determining the low temperatures on clear, still nights.

The thermometer at the Weather Bureau office in Columbus is in the center of the city at an elevation of 173 feet above the street level. The thermometer at the university station is in a shelter in the large grounds about 6 feet above the ground. The two points are about 3 miles apart.

The kiosk thermometer in the small statehouse grounds at a height of 5 feet showed a record of −8° the same morning. Thus 3° will represent the approximate difference due to elevation in this case and 15° the difference between the city temperature where cooling by radiation is largely prevented, and the country temperature, where the radiation from the surface of the earth is very rapid.

Other stations in the table show differences in temperature due to variations in elevations and topography.

At Hiram, for example, the lowest temperature was −10°, while at Garrettsville, only a few miles away but 255 feet lower, it was −30°. These records represent the difference in temperature between the hilltop and the valley on clear, still nights rather than the mere difference due to elevation. The difference between Cadiz and New Alexandria was only 7°, although the difference in elevation is practically the same as between Hiram and Garrettsville. But New Alexandria, although lower than Cadiz, is itself well up on the hillside.

The difference in temperature between hilltop and the valley is also well shown by the two Philo stations, which are only a few miles apart: No. 1, −7°; No. 2, −27°. The greatest difference, however, is indicated between Somerset, which is on a hilltop, and Milligan, located in a narrow cup-shaped valley. The station at Milligan has the lowest temperature record in the State for this month, −37°, and for the State as a whole, −39°, on February 10, 1899.

These data, with others in the table as well as in the general tables for the State, printed elsewhere in this review, indicate that there are probably some peach orchards situated on the highest elevations and possibly along the immediate Lake Shore, which have escaped a total loss. But that the peach buds are killed throughout the greater portion of Ohio is undoubted.

The tables indicate that the temperatures at Ironton, Portsmouth, and Cincinnati were not low enough to cause a total loss to the peach crop. Yet the instruments at each of these points are located in the city and must have been affected thereby as in the case of Columbus. The thermometer at Green, in southern Adams County, is in the open country, although close to the river and the record there was −20°.

When it is remembered that systematic orchard heating has kept the temperature from 10° to 15° higher within the orchard than prevailed outside there seems every reason to suppose that most of the peach crop in Ohio might have been saved during this cold spell. This would hardly have been possible in the low valleys, where the temperature fell to over 30° below zero, but it seems perfectly practicable along the lake and in other sections where it was only 5° to 10° below the danger point.

Record of low temperatures, Ohio, January, 1912.

Station.	County.	Elevation above sea level.	Lowest temperature.
Toledo	Lucas	769	− 5
Bowling Green	Wood	670	−21
Sandusky	Erie	629	− 5
Vickery	Sandusky	588	−18
Cleveland (1)	Cuyahoga	762	− 8
Cleveland (2)	do	754	−13
North Royalton	do	1,000	−11
Akron	Summit	1,081	−12
Medina	Medina	944	−24
Hillhouse	Lake	997	−24
Conneaut	Ashtabula	675	−22
Hiram	Portage	1,260	−10
Garrettsville	do	1,005	−30
Cadiz	Harrison	1,245	−10
New Alexandria	Jefferson	1,050	−17
Bangorville	Richland	1,380	−10
Cardington	Morrow	1,010	−21
Somerset	Perry	1,080	−10
Milligan	do	875	−37
Philo (1)	Muskingum	1,018	− 7
Philo (2)	do	750	−27
Demos	Belmont	1,325	−13
Clarington	Monroe	600	−20
Marietta	Washington	627	−21
Syracuse	Meigs	583	−13
Thurman	Gallia	696	−11
Ironton	Lawrence	575	−11
Portsmouth	Scioto	527	−12
Green	Adams	500	−20
Cincinnati	Hamilton	628	− 9
Camp Dennison	do	570	−27
Jacksonburg	Butler	975	−13
Hillsboro	Highland	1,063	−11
Frankfort	Ross	745	−31
Columbus	Franklin	918	− 5
Ohio State University	do	757	−23

THE CLIMATE OF THE CITY AND COUNTRY COMPARED.

[By J. WARREN SMITH, Professor of Meteorology.]

During clear nights the surface of the earth and objects upon it lose heat very rapidly by radiation. The air in contact with these surfaces loses its heat by conduction after the surfaces have cooled by radiation. As cold air is denser than warm air, it follows that if there is little wind blowing the air near the surface of the ground during the night grows colder than that a few feet above, especially in low or level places. Hence the air near the surface of the ground is always colder in clear, still nights in slight depressions than on the hillsides and over a low plain than it is in the more broken country.

The clearer and cleaner the air the more rapid the radiation also, hence it is found that the temperature of the air is always lower in country districts during clear, still nights than it is in nearby cities. This is particularly true in the winter time, when there is much smoke in the air over the cities and when convection currents are set up both by the heat from chimneys and from large office buildings in addition to those caused by the uneven surfaces presented by buildings of different heights, streets, yards, etc.

When such conditions do occur and there exists a marked difference in the temperature records in the city and country, the general opinion is expressed that the climate of the city is different from that of the country. Also that the Weather Bureau instruments, located as they usually are upon the roof of a tall office building, do not give true records.

Since 1882, in addition to the Weather Bureau records in the city of Columbus, Ohio, standard thermometers

and a rain gauge have been located about 3 miles north of the center of the city on the campus of the Ohio State University.

The Weather Bureau instruments during that time have been located on the top of several different office buildings, the present location being about 170 feet above the street. The university instruments are in a large open campus fully 60 rods from the nearest residence street and with no large manufacturing plants within at least 1 mile. The thermometers are exposed in a standard shelter 6 feet above a grass sod, and the location is splendid and typical of the country.

Average temperature and precipitation data have been compiled for the two stations for the 29 years from 1883 to 1911, inclusive, and are shown in the attached table.

The average annual temperature is 1.2° lower at the university station than at the Weather Bureau office. The mean maximum temperature for the year is 0.3° higher and the mean minimum 3.3° lower at the university than at the Weather Bureau station. The highest temperatures recorded differ very slightly, but the lowest temperatures are considerably lower at the university than in the city.

The fact that the mean temperature figures and even the mean minimum figures are so close together shows that the clear, still night conditions with wide temperature differences are unusual and that in general well-located thermometers in the cities do give reliable data.

A comparison of the precipitation records in the table at these two stations shows also that the rain gauge on the roof of the large office building catches practically the same amount of rain as the one located in the open near the ground. During some of the months the average is slightly greater at the Weather Bureau station than at the university, while the total for the year averages only 0.52 inch less at the Weather Bureau office than at the university.

Temperature and precipitation for 29 years.

	Monthly and annual.			Mean maximum temperature.			Mean minimum temperature.		
	Weather Bureau.	University.	Difference.	Weather Bureau.	University.	Difference.	Weather Bureau.	University.	Difference.
	°	°	°	°	°	°	°	°	°
January	28.9	27.7	−1.1	36.1	36.0	−0.1	21.6	19.5	−2.1
February	29.8	28.9	−0.9	37.5	37.6	+0.1	21.7	20.5	−1.2
March	39.7	39.2	−0.5	48.1	48.7	+0.6	31.2	29.5	−1.7
April	51.1	49.7	−1.4	60.7	61.1	+0.4	41.5	38.3	−3.2
May	62.2	60.6	−1.6	72.2	72.3	+0.1	52.1	48.9	−3.2
June	71.0	69.7	−1.3	81.0	81.1	+0.1	61.0	58.2	−2.8
July	74.9	73.4	−1.5	85.1	85.3	+0.2	64.7	61.5	−3.2
August	72.7	71.4	−1.3	82.9	83.6	+0.7	62.5	59.1	−3.2
September	66.9	65.6	−1.3	77.4	78.2	+0.8	56.4	52.9	−3.5
October	54.1	52.5	−1.6	63.8	64.5	+0.7	44.4	40.6	−3.8
November	41.8	40.6	−1.2	49.6	49.9	+0.3	34.1	31.2	−2.9
December	32.5	31.4	−1.1	39.4	39.5	+0.1	25.3	23.4	−1.9
Annual	52.1	50.9	−1.2	61.2	61.5	+0.3	43.0	40.3	−3.3

	Highest temperature.			Lowest temperature.			Average precipitation.		
	Weather Bureau.	University.	Difference.	Weather Bureau.	University.	Difference.	Weather Bureau.	University.	Difference.
	°	°	°	°	°	°	*Inches*	*Inches*	*Inches.*
January	72	72	0	−20	−32	−12	2.93	3.08	+0.15
February	72	72	0	−20	−20	0	3.05	3.04	−0.01
March	84	85	+1	0	− 7	− 7	3.28	3.37	+0.09
April	89	89	0	20	11	− 9	2.84	2.96	+0.12
May	96	96	0	33	27	− 6	3.69	3.89	+0.20
June	99	99	0	41	38	− 3	3.35	3.52	+0.17
July	104	103	−1	50	41	− 9	3.52	3.18	−0.34
August	98	101	+3	42	39	− 3	2.91	2.88	−0.03
September	98	99	+1	32	26	− 6	2.57	2.67	+0.10
October	90	91	+1	20	12	− 8	2.36	2.31	−0.05
November	77	77	0	3	− 8	−11	2.65	2.62	−0.03
December	67	69	+2	− 8	−21	−13	2.49	2.64	+0.15
Annual	104	103	.....	−20	−32	.....	35.64	36.16	+0.52